SECRET

MONTHLY REPORT

[redacted]

25X1

PAR 204

3 April 64

SUBJECT: Contact Chip Printer

TASK/PROBLEM

1. Develop and fabricate a contact printer to expose 4 x 5 inch film chip prints with minimum loss of information from selected areas of high quality roll negatives (up to 200 lines/mm resolution).

2. Each chip will have a two-line title across one end: the first line human readable, and the second to repeat the first in machine-readable characters.

DISCUSSION

3. A rough draft of revised technical objectives was prepared that is based on the contractor's study of the revisions presented by the customer at the 3 and 4 February program review conference. The feasibility of establishing a design group to perform this task together with those of PAR's 202, 205, and 224 is being considered since many of the subassemblies have common requirements.

PLANNED ACTIVITY

4. The revised technical objectives will be edited, published, and presented to the customer by 15 April 64.

SECRET

30 January 1964

MEMORANDUM FOR THE RECORD

1. SUBJECT: PAR #204, [redacted] HQ Contact Printer

25X1

2. REFERENCES: a. [redacted] Quarterly Report, Contract [redacted] Second Quarter, FY 64.

b. Conference at P&DS, 23 January 1964.

3. ACTION REQUIRED: Reorient objectives.

4. ACTION TAKEN: The objectives of PAR #204 should be reoriented as follows:

Design a contact printer for production of a specific format image area and second stage printing of auxiliary information.

a. Input Materials:

Negative roll film of up to 500 foot lengths, 70mm through 9½ inches in width with formats varying from 70mm by 70mm to 9½ inches by 50 inches and 70mm through 9½ inch roll film negative continuous strip type.

b. Output Materials:

(1) Five inch (standard stock size) dupe positive roll film of a specific format containing a contact image area of 70mm x 95mm, security classification, and a human-machine readable code area of 95mm by 10mm. The remaining area of the 5 inch (4.96" or 127mm) x 100mm format will be allocated to user information.

(2) Capability shall be provided for extending the image area to 90mm by 95mm size or 112mm by 95mm size, if desired, using that space reserved for user information.

(3) A fiducial marking system shall be employed to identify the center position of the image and shall be printed in the image format at all sizes (70mm x 95mm, 90mm x 95mm and 112mm x 95mm).

e. Other Considerations:

(1) Operator selection of number of prints (10-15).

(2) Automatic advance, registration, exposure control, transport to auxiliary data station, etc.

(3) Manual override.

(4) Output rates.

(5) Slew and rewind rates.

(6) Interlocks to reduce human error.

(7) Indicator lights to indicate system readiness, malfunctions, end of print stock, etc.

(8) Anticipated resolution (accuracy at 1:1 scale).

(9) Automatic threading.

(10) Service life and maintenance.

(11) Compatibility of take-up magazines.

(12) Cleaning (number of stations, brushes, static eliminators, etc.).

(13) Adjustable millimeter counter on input material which can be preset to count frames from 70mm to 150 inches.

(14) Color materials.

(15) Daylight operation.

(16) Ease of loading and operation.

(17) Tape input of auxiliary data (C-2).

(18) Adjustable X - Y measurement system.

5. COORDINATION: None required.

6. COPIES FURNISHED:

Development Branch, P&DS

6 Dec 63

DESIGN OBJECTIVE

HQ Contact Printer for Selected Areas (PAR-204)

Problem

The present practice of cutting a small length from roll prints for detail photo interpretation work leads to many problems. There is a need to provide the photo lab with the capability to expose maximum quality film "chip" prints from selected areas of the roll negative.

This PAR is one of two approaches being considered to meet this need. Here we propose to provide a maximum quality contact print. The alternate approach (PAR-205) is to provide a maximum quality 4X enlargement.

Proposal

We propose to design a contact printer to print a section of the photography around an image of interest which will:

1. Cover the full width of the negative, and
2. Cover about 4 inches along the length of the negative plus about 1 inch additional for a title exposure.

Both negative and print stock will be in roll form. The width of the print stock will be equal to or greater than that of the negative.

The negative and print stock will be placed in contact under tension upon the surface of a cylindrical arch. A soft roller under pressure (squeegee roller) will be passed across the area to be printed to sweep away the residual air layer separating the two films. Both films are moved through cleaning stations (or station) before entering the printing gate area. Print exposure will be made by opening and closing a shutter while the films are held stationary upon the arch surface following the passage of the squeegee roller.

A breadboard model of this technique of producing contact will be tested in Phase I to learn the image quality obtainable.

The printer mechanism will be designed to conveniently produce an exposure series of prints to assure the production of a print having the optimum exposure. Convenient production of multiple prints will also be possible.

1. Negative Transport

The design of the negative transport system is of prime importance since the major requirement upon the printer is for prints from one or two image areas in each negative roll coming to it. The transport system should be as easy to load and use as a motorized rewind table.

An illuminator, possibly safelighted, will be part of this assembly to permit easy search and positioning of the image of interest.

2. Print Stock Transport

The print stock transport system will provide a dark enclosure with a "dark slide" to be opened before bringing the negative into contact with the print stock and to be closed during negative loading, etc. Convenient means to remove a length of exposed print stock and to rethread the transport is required.

3. Densitometry and Exposure Control

Convenient and rapid means to physically predict the correct printing exposure from measurement of the negative will be provided. Several exposure control techniques are under consideration. The most desirable one will be designated in the design studies.

4. Light Source

For black and white prints a narrow band filtered high pressure mercury arc source is planned. Our experience indicates this type of source provides maximum image sharpness.

5. Image Position Control

Since we propose to print the full width of the negative no "across-frame" positioning of the print stock relative to the negative is required. Across-frame positioning of the exposure prediction equipment will be required to permit measurement of the negative in the area of interest.

Means to measure along-frame coordinates similar to that used in the 10-20-40X Enlarger are proposed. The metering mechanism will be revised to be film driven, thus allowing effective use of the Motorized Rewind Table spindles and controls.

6. Titling

Two possible means for title application are proposed:

(a) Transparent frisket held close to the negative and exposed by the main printing light.

(b) A bank of hand settable characters (by knurled wheels or possibly by keyboard) to expose by projection through the base of the print stock.

7. Color Prints

Capability for color print exposure has not been included in our estimates. However, we propose to design the equipment such that moderate modifications and addition can provide this capability. The anticipated changes are:

(a) Replacement of the mercury arc source by a tungsten lamp.

(b) Addition of appropriate color filtering in the exposure prediction equipment.

(c) Addition of means for adjustment of color balance in the printing light.

Because of the potential usefulness of the prototype printer from this project for black and white print production, we urge that if the color print capability is desired it should be authorized as a separate project resulting in a separate prototype. This additional project would require new design only for those elements that must be changed for color.